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from the Author

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TO 1904

BY

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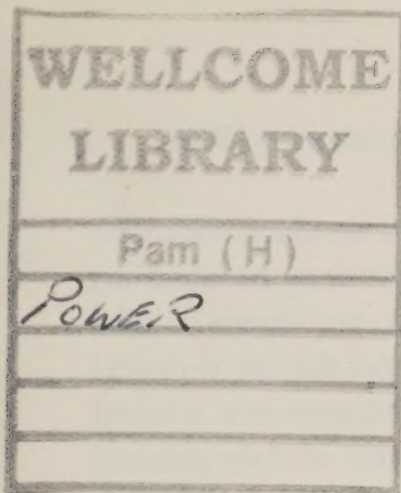
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THE HISTORY OF ~~THE~~ AMPUTATION OF THE BREAST TO 1904.*

By SIR D'ARCY POWER, K.B.E., F.R.C.S.,

Consulting Surgeon to St. Bartholomew's Hospital, London.

GENTLEMEN,—I had not much difficulty in choosing a subject when I was honoured by your invitation to give the sixteenth William Mitchell Banks memorial lecture. He was interested in cancer of the breast from an early period in his professional life and more especially after he became surgeon to the Liverpool General Infirmary. His writings show that he had a sound knowledge of the history of medicine, and his essays “The Gentle Doctor” and “Physic and Letters” prove that he had a cultivated taste. It was clear, therefore, that a record of the successive stages through which the operation for cancer of the breast has passed would have pleased him, and the more so because hitherto it has only been made in detached pieces. I shall tell you the story briefly but accurately and you will see that in the later chapters Mitchell Banks played a part which has not yet been properly appreciated.

Cancer of the female breast has been known as long as there is any history of medicine. The Greek and Roman surgeons wrote of it with horror. No mention is made of the early stages and it is always described as being ulcerated and inoperable. This may have been the fault of the surgeon, but in classical times there were good diagnosticians who were not likely to

* The Sixteenth William Mitchell Banks Memorial Lecture, delivered at the University of Liverpool, November 16th, 1933.

overlook a lump in the breast, though it is true they make no mention of cancer of the tongue, which is even more obvious. The woman herself was perhaps somewhat to blame. The swelling was painless at first, and the operation for its removal was so painful and useless that she said nothing about it until an offensive fungating mass, pain and failure of her general health from repeated small hæmorrhages obliged her to seek advice.

The breast, too, in those early times was a symbol of fertility and of womanhood. A woman who had lost her breast was mutilated in mind as well as in body. It was this feeling which placed St. Agatha in the noble army of martyrs. She lived, as you know, at Catania, in Sicily, in the middle of the third century, when Decius was Emperor, and a shrine to her memory still exists in Malta. The operation was radical, but its like was practised for many hundred years after her time. The breasts were replaced and healed miraculously by first intention. Four days after the operation she was as well as ever. The story is told in the Golden Legend and there are numerous pictures of her martyrdom.

Æsthetic considerations hindered early operation, certainly as late as 1670. Ladies then wore dresses cut even lower than they are now, and it was an ordinary form of salutation for a gallant to handle the breasts of a quite staid and respectable friend. A hundred years earlier John Halle, the surgeon at Maidstone (1529—1568), says in the remarkable diatribe which he wrote against the fashions of his time :—

“ When I was a boy, I now well remember
 (Though I at that time of age was but tender.)
 That women their breasts did show and lay out
 And well was that maid whose dugs then were stout.
 Which usance at first came up in the stews
 Which men’s wives and daughters after did use.
 The preachers at that then gan out to cry
 And honest men did it loathe and defy.
 Wherefore they left off that foul sinful guise
 And straight they laid down their hair to their eyes.”

The Hippocratic surgeon (B.C. 400) advises against operation. *Celsus*, 300 years later, says that caustics should first be applied and if there be no improvement the breast should be removed either by the knife or with the cautery. He adds that excision merely removes the affected part, and burning only exasperates it, so both are useless.

Galen (A.D. 130-200) recommends a clean sweep of the breast but forbids ligature of the vessels because he thinks it leads to recurrence. He says that early operation is advisable as the disease is curable at the beginning. When the breast is ulcerated it should neither be cut nor burnt.

Leonidas (A.D. 200), as might be expected from a surgeon of the Alexandrian school, is in favour of operation and gives the first detailed account of the manner of performing it. He says "Laying the patient on her back I make an incision into the breast above the cancer and immediately apply the cautery until the bleeding is stopped. I then make an incision deeply into the substance of the breast and again apply the cautery alternately cutting and burning in order to stop the bleeding. In this way there is no danger of hæmorrhage. I burn the parts again when the removal is completed until they are quite dry. The first cauterisations are to stop the bleeding, the last are to eradicate the disease."

John Ward. This method of operating lasted well into the eighteenth century in England. The Rev. John Ward, who was Vicar of Stratford-on-Avon from 1662—1682, and was at heart a surgeon and pathologist, writes of one of his parishioners: "A cancer in Mistress Townsend's breast of Alveston, taken off by two surgeons, the one's name was Clerk of Bridgnorth, the other's was Leach of Stourbridge. First, they cut the skin across and laid it back; then they worked their hands in it, one above, the other below, until their hands met and so brought it out. They had their needles and waxed threads ready but never used them, and also their cauterising irons, but they used them not. She lost not above six ounces of blood in all. Dr. Needham, coming too late, stayed the next day to see it opened. He said it was a Meliceris and not a perfect cancer but it would have been one quickly. There came out a flow of a

great quantity of waterish substance so much as would fill a flagon. When they had done they cut it off, one, one bit and another, another. Put a glass of wine in and some lint and so let it alone until next day. Then they opened it again and injected myrrh, aloes and such things as resist putrefaction, and so bound it up again. Every time they dressed it they cut off something of the cancer that was left behind. The surgeons were for applying caustics, but Dr. Needham said 'No, not till the last, since she could endure the knife.' They prepared her body somewhat by purges, then let her blood the day before. She endured it with infinite patience all along, not offering to lay her hand upon it, but a warm cloth to the other breast all the time.

"One of the surgeons told her afterwards that she had endured so much that he would have lost his life ere he would have suffered the like; and the Doctor said he had read that woman would endure more than a man but did not believe it until then.

"The way, how and where it should be cut was marked out in ink by Dr. Edwards, who lives at Bridgnorth. Mrs. Townsend liked him very well. He said if they could prevent a Gangrena there was little fear, but it might be a cure if she fell not into a fever."

The tumour was evidently a cystic sarcoma, such as Sir Benjamin Brodie described more than a hundred years later. The favourable prognosis was belied, and a few months later Ward records "Mistress Townsend of Alveston being dead of cancer, Mr. Edis and I opened her breast in the outward part and found it very cancerous. It had been broken and a Melicerous part was yet remaining when we saw it, which, being lanced, yielded two porringers-full or more of a very yellow substance which came plentifully out of the cavity of the breast. That flesh which was grown again, after part was taken out, was of a hard gristly substance which seemed very strange. The ribs were not putrefied so far as we could discover nor anything within the breast of a cancerous nature, for we ran the knife into the breast through the intercostal muscles. The cancer was a strong one as was evident. We wanted sponges and things convenient or else we had opened the cavities of the breast.

"Dr. Needham hath affirmed that a cancer is as much within

as without the breast, and he hath seen a string, as I was told, going from the breast to the womb. I suppose it was the mammillary vein, full of knots which were cancerous and hung much like a rope of onions."

The use of caustics, which Mistress Townsend was fortunately spared, was a very old method of treatment. It was largely employed by the Arabian surgeons who had a rooted objection to the knife, and it certainly lasted until my own time. The Museum at St. Bartholomew's Hospital contains cancers removed from the breast in this manner in 1885 and 1888 (Y. 140 and Y. 141). Arsenic paste was used in one case, zinc chloride in the other. The cancers exfoliated as large masses three weeks after the application, leaving a cup-shaped depression in the breast. It was horribly painful and recurrence quickly occurred in both patients.

The credit of attempting to cure rather than to remove cancer of the breast belongs, I think, to Jean Louis Petit (1674-1750), the first Director of the French Surgical Academy and a foreign Fellow of our own Royal Society. He taught that "the roots of a cancer were the enlarged lymphatic glands; that the glands should be looked for and removed and that the pectoral fascia and even some fibres of the muscle itself should be dissected away rather than leave any doubtful tissue. The mammary gland, too," he said, "should not be cut into during the operation." On the other hand he removed as little of the skin as possible and tried to preserve the nipple. All this he taught by example and word of mouth so that it only became known to his own pupils for his *Traité des Operations* was not published until 1774—twenty-four years after his death—though his teaching was preserved and continued by René Garengeot (1688-1760), his pupil, colleague and admirer. Garengeot himself had published *Traité des opérations de Chirurgie*, in 1720. Petit's teaching was known outside France by 1739, and the English translation of Lorenz Heister's (1683-1758) *Surgery* published in that year, describes the operation in the following words:—

"Before we proceed to so important an operation it may be first necessary to enquire whether the adjacent axillary glands are indurated only or whether they are infected and

communicate with the cancer ; for in that case extirpating the breast will not cure the patient.

“ Before the surgeon proceeds to this operation he should first prepare the patient for it by a proper diet and way of living that the cancer may not be too large and irremovable. And when he finds it in that condition occupying but one part of the breast the patient should be placed in a high chair. The arm belonging to the affected breast should be held downward and backward and extended so that the pectoral muscle may be easily separated from the disordered part of the breast. It is the practice of many to make a large crucial incision through the integuments of the cancer, which, being carefully separated by the scalpel and the cancer freed from the sound parts on every side is then extracted. This may be done commodiously with a ligature or the disordered part may be elevated by a hook only, but where the integuments are also affected and strictly joined to the cancer there is little hope to expect a perfect cure if they are not both cleanly extirpated together.

“ Immediately after the operation it may be convenient to let the wound bleed a few ounces, according to the strength of the patient, if they are not of a weak and infirm habit ; which may prevent a fresh hæmorrhage, inflammation or fever. Nor is it necessary to apply an actual cautery to stop the bleeding in this operation, as the ancients were of opinion. It may be sufficient to tie up the larger vessels and to apply a quantity of scraped lint kept in place by a thick and broad compress and a long bandage.”

Quoting Garengot, he says that “ sewing up the lips of the wound immediately after operation, as was practised by J. L. Petit, is not only the safest method of arresting hæmorrhage but is also the quickest way of healing the wound and preventing the return of the cancer.” He might also have added “ and of saving the life of the patient,” too many of whom died of septic infection.

The whole credit of introducing an improved operation seems to rest with J. L. Petit. Scultetus (1595-1645) and Gerard Tabor removed the breast by what were then thought to be improved methods but they only amputated the organ and left the infected lymphatic glands untouched. Gerard Tabor’s thesis “ On a

new way to extirpate cancer of the breast" was published in 1721, and was written under the inspiration of Haller.

Benjamin Bell, surgeon to the Edinburgh Royal Infirmary, published his system of surgery in 1784. It passed through several editions and guided the practice of more than one generation of surgeons. He devotes a chapter to amputation of the cancerous mamma, teaching that "when practitioners have an opportunity of removing a cancerous breast early they should always embrace it; that as little skin as possible should be removed, and that the breast should be dissected off the pectoral muscle, which ought to be preserved. If any indurated glands be observed they should be removed and," he adds, "particular care should be given to this part of the operation, for, unless all the diseased glands be taken away no advantage whatever will be derived from it. Even when only a small portion of the breast is diseased the whole mamma should be removed. The axillary glands should be dissected out by opening up the armpit, but as much skin as possible should be preserved. I have done this," he says, "since 1772. The older surgeons took away the skin and left the glands." Benjamin Bell's operation became the routine method of amputating the breast, at any rate in Scotland, until after the introduction of anæsthetics in 1847.

Writing in his *Principles of Surgery* in 1842, James Syme says, after considering various palliative measures for destroying cancer, "the only proceeding that deserves at all to be considered a remedy for cancer is removal of the morbid structure. This may be done sometimes by the actual or potential cautery, but these means are very apt to destroy the disease only partially and consequently do no good, but on the contrary harm, by exciting greater activity in the portion that remains.

"The knife or scissors effect the extirpation most easily and securely. It would be subjecting the patient to useless pain and would bring surgery into discredit to attempt extirpation in cases where the extent or connections of the disease prevented its complete removal. It is also incumbent upon the surgeon to search very carefully for glands in the course of the absorbents that may become affected since it appears that the result of

operations for carcinoma when the glands are affected is almost always unsatisfactory however perfectly they may seem to have been taken away. The reason of this probably is that the glands do not participate in the disease unless the system is strongly disposed to it and consequently their removal, however freely and effectually executed, cannot prevent the patient's relapse. In performing the operation it is not sufficient to take away the mere indurated mass as the surrounding parts are always more or less vitiated in their disposition. If the disease is situated in a distinct organ the whole of it ought always to be removed however small the part of it which is externally affected may be and when the tissue concerned is not in this way circumscribed, the knife should be carried as wide as possible from the tumour."

Professor Syme (1799-1870) was writing from his experience at a time when there were no anæsthetics and too many of his patients died of septic infection after the operation. Dr. John Brown gives an excellent account of such an operation as it was done at Minto House, Edinburgh, in 1821. He "dressed" for Syme, and the pathetic little story told in "Rab and his Friends" is probably correct in its main outline. He says:—

"My Master, the surgeon, examined Alie, who had a tumour in her breast. It could be removed—it might never return——It would give her speedy relief.—She would have it done?—She curtsied and said 'When?' 'To-morrow,' said the kind surgeon.

"The following day at noon the students came hurrying up the great staircase. The operating theatre is crowded. The surgeon with his staff of assistants is there. In comes Alie, one look of her quiets and abates the eager students, that beautiful old woman is too much for them, these rough boys feel the power of her presence. She walks in quickly but without haste, dressed in her mutch, her neckerchief, her white dimity shot gown and her black bombazeen petticoat. Alie stepped up on a seat and laid herself on the table as her friend the surgeon told her, shut her eyes, rested herself on me and took my hand. The operation was begun at once. It was necessarily slow and chloroform—one of God's best gifts to his suffering children—was then

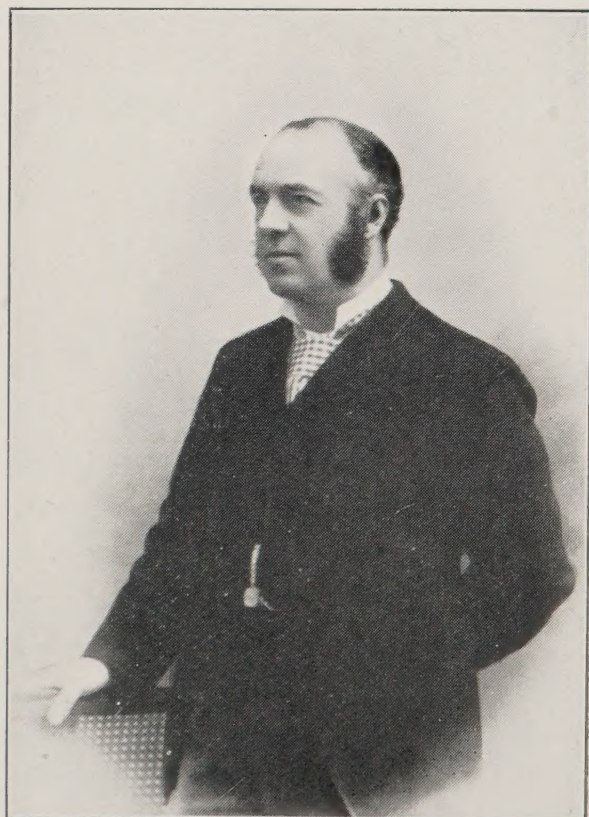


J. L. PETIT [1674—1760].

FIRST DIRECTOR OF THE FRENCH ROYAL ACADEMY OF SURGERY.



WILLIAM STEWART HALSTED
 IN 1877.



WILLIAM MITCHELL BANKS
circa 1889.

unknown. The surgeon did his work. The pale face showed its pain but was still and silent.

"It is over ; she dressed, steps down gently and decently from the table, then turning to the surgeon and the students she curtsies, and in a low clear voice begs their pardon if she has behaved ill.

"For some days Alie did well. The surgeon dressed her and spoke to her in his own short, kind way. So far, Well ; but four days after the operation my patient had a long and sudden shivering. I saw her soon after ; her eyes were too bright, her cheek coloured ; she was restless and ashamed of being so ; the balance was lost ; mischief had begun. On looking at the wound a blush of red told the secret ; her pulse was rapid ; her breathing anxious and quick. She wasn't herself, as she said, and was vexed at her restlessness. We tried what we could. Alie got worse, began to wander in her mind, gently ; was more demonstrative in her ways ; rapid in her questions and sharp at times. For a time she knew her head was wrong and was always asking our pardons—the dear old woman—then delirium set in, strong without a pause. Her brain gave way ; she sang bits of old songs and psalms, stopping suddenly, mingling the psalms of David and the diviner words of his Son and Lord, with homely odds and ends and scraps of ballads.

"One night she had fallen quiet and, we hoped, asleep. We put down the gas and sat watching her. Suddenly, she sat up in bed and taking a bedgown which was lying on it rolled up, she held it eagerly to her breast. We could see her eyes bright with a surprising tenderness and joy, bending over this bundle of clothes. She held it as a woman holds her sucking child, opening out her nightgown impatiently and holding it close and brooding over it and murmuring foolish little words, as one over whom his mother comforteth and who is sucking and being satisfied. It was strange and pitiful to see her wasted dying look, keen and yet vague—her immense love. And then she rocked it backwards and forwards as if to make it sleep, hushing it and wasting on it infinite fondness. This was the close. She sank rapidly ; the delirium left her, but, as she whispered, she was clean silly ; it was the beginning before

the final darkness. She lay for some time breathing quick and passed away so gently that when we thought she had gone James, in his old-fashioned way, held the mirror to her face. After a long pause one small spot of dimness was breathed out; it vanished away and never returned, leaving the blank, clear darkness of the mirror without a stain."

The tragic story of death from septic infection or early return of the disease owing to imperfect removal was so well known in the middle of the last century that amputation of the breast was not encouraged by surgeons in the United Kingdom.

Sir James Paget (1814-99) in his usual eloquent language gives an account of operations for cancer of the breast at the dawn of surgical pathology, the results being based on facts obtained before the introduction of anæsthesia. He says:—"We have to ask ourselves whether it is probable that the operation will add to the length or comfort of life, enough to justify incurring the risk for its own consequences.

"I cannot doubt that the answer may be often in the affirmative:—(i) In cases of acute hard cancer the operation may be rightly performed; though speedy recurrence and death may be expected, its performance is justified by the probability that it will in some measure prolong life and will save the patient from dreadful suffering. (ii) On similar grounds the operation seems proper in all cases in which it is clear that the local disease is destroying life by pain, profuse discharge or mental anguish, and it is not accompanied by evidence of such cachexia as would make the operation extremely hazardous. (iii) In all the cases in which it is not probable that the operation will shorten life, a motive for its performance is afforded by the expectation that part of the patient's life will be spent with less suffering and in hope, instead of despair; for when they are no longer sensible of their disease there are few cancerous patients who will not enjoy the hope of long immunity, though it be most unreasonable and not encouraged.

"On the other side there are many cases in which the balance is clearly against operation:—(i) In well-developed chronic cancers, especially in old persons, it is so little probable that the operation will add either to the comfort or to the length of

life that its risk had better not be incurred. These indeed are the cases in which the operation may be longest survived, but they are also those in which without operation life is most prolonged and least burdened. (ii) In cases in which the cachexia or evident constitutional disease is more than proportionate to the local disease, the operation should be refused; it is too likely to be fatal by its own consequence or possibly by accelerating the progress of cancer in organs more important than the breast. On similar grounds and yet more certainly it should not be performed when there is any reasonable suspicion of internal cancer. (iii) If there be no weighty motives for its performance the operation should be avoided in all patients whose general health (independently of the cancerous diathesis) makes its risk unusually great, in all—for example—who are very feeble, very fat, over-fed, intemperate or in any of those conditions which make persons unfavourable subjects for surgical operations. In every case we should keep in view the two-fold method of destruction by this disease. It may destroy life by its consequences as a local disease; or, by its primary and specific cachexia which may be progressive independently of the local affection. Usually indeed the local and constitutional parts mutually affect and aggravate each other and both contribute to the fatal issue; but since they do not always contribute in the same proportions, our object should be to ascertain which will contribute most—the local disease which the operation can remedy or the constitutional which, if at all affected by the operation may be made more intense.”

Sir James Paget here gives no advice as to the method to be adopted for the removal of the breast. He was only pointing out when the surgeon should operate and when he should refrain from doing so for the relief of a disease which seemed to him to be incurable.

Robert Liston (1794-1847), writing a year or two earlier, is equally despondent, and he was speaking as an operating surgeon of large experience.

He says:—“Recourse may be had to the knife in some cases but the circumstances must be very favourable indeed to induce a surgeon to recommend or warrant him in undertaking any operation for the removal of malignant disease of the breast.

When the disease has been of some standing there is a considerable risk of the axillary glands having become contaminated. No one could now be found so rash or so cruel as to attempt the removal of glands thus affected whether primarily or secondarily."

In the United States matters had proceeded on similar lines but the progress had been a little more rapid. Dr. Joseph Pancoast, Professor of General Descriptive and Surgical Anatomy in Jeafferson Medical College, Philadelphia, described in 1844 the patient as being seated in a chair and having the enlarged and scirrhus chain of axillary glands removed with the tumour. The breast is to be dissected loose and is used as a handle to draw down the chain of axillary glands which is connected by the bundles of absorbents and some cellular tissue. After the cautious isolation of the glands a ligature is thrown round the pedicle which is then divided. "It is important," he says, "that the breast and glands should all be removed in one piece," but he makes no mention of any division of the muscles to allow of better access to the axilla.

This good teaching was neutralised by his successor, Professor Samuel D. Gross (1845-86), who advocated the old and bad practice of sacrificing thoroughness to æsthetic considerations. He taught that "the operation should endeavour to preserve as much of the common integuments as possible in order to effect a complete covering to the surface of the wound. This rule is of great importance and should never be departed from. Another precept of nearly equal consequence, but one which is not generally insisted upon, is to preserve as large a quantity as is practicable of the subcutaneous cellulose-cutaneous tissue with the view of maintaining unimpaired the circulation of the skin. Whenever this is much interrupted, as it necessarily must be in a very close dissection, there is an additional danger of a speedy return of the abnormal action and also greater risk of erysipelas immediately after the operation. The proper operation is amputation, not excision."

It is somewhat remarkable that as Pancoast's successor Gross makes no mention of the axillary glands. His teaching was distinctly retrograde, but his son, Prof. Samuel W. Gross

(1838-89), also of Philadelphia, more than made up for his father's delinquencies.

Thomas Bryant, then assistant surgeon at Guy's Hospital, was giving better advice in 1864 when he taught that "In operating for cancer of the breast it is unquestionably wiser to excise the whole gland and it is well not to be over-anxious about preserving too much skin, for if any doubt exists as to its perfect healthiness the suspected portion had better be excised. It is always important when dissecting out the tumour to keep clear of all diseased tissues and in fatty subjects to leave a fair covering between the incision and the tumour itself, for there is good reason to believe that any early return of the affection is too often to be explained by want of attention to the practice to which I have just alluded."

The real change of outlook dates from 1867, when C. H. Moore read a remarkable paper on May 28th at the Royal Medical and Chirurgical Society in London. He was at that time surgeon to the Middlesex Hospital, and had long been in charge of the cancer wards. He was an accurate observer, but his colleagues thought that "he combined extreme caution with surprising rashness," and his views therefore received less attention than they deserved.

Moore set out to discover why recurrence took place after operations for cancer of the breast and arrived at the following conclusions :—

"Local recurrence of cancer after operations is due to the continuous growth of fragments of the principal tumour.

"Such recurrence may take place also in a residual part of the organ, respecting which it cannot be asserted that it was cancerous at the time of the operation.

"Such recurrence may further happen in a structure adjoining a completely extirpated breast, and on a comparison of cases may be held to be produced by disseminated fragments of the original tumour.

"The recurrent cancer is subject as well as due to local conditions, and especially adapts itself to the distribution of the absorbents.

"After the removal of a portion of the breast, the recurrent cancer

does not involve the remainder of the organ indiscriminately, but commences in that part of it which immediately adjoins the scar.

“The progress of recurrent cancer after a partial removal of the breast is not exclusively organic, and does not even show a preference for that organ but rather is centrifugal from the scar; and, when free in both directions, it tends toward the axilla earlier than to the residue of the breast.

“It is not sufficient to remove the tumour, or any portion only of the breast in which it is situated; mammary cancer requires the careful extirpation of the entire organ.

“The situation in which the operation is most likely to be incomplete is at the edge of the mamma next the sternum.

“When any texture adjoining the breast is involved in or even approached by the disease, that texture should be removed with the breast. This observation relates especially to skin, to lymphatics, to much fat, and to pectoral muscle. The attempt to save skin which is in any degree unsound is of all errors perhaps the most pernicious, and whenever its condition is doubtful, that texture should be freely removed.

“In the performance of the operation it is desirable to avoid, not only cutting into the tumour, but also seeing it. No actually morbid structure should be exposed lest the active microscopic elements in it should be set free and lodge in the wound. Diseased axillary glands should be taken away by the same dissection as the breast itself, without dividing the intervening lymphatics; and the practice of first roughly excising the central mass of the breast, and afterwards removing successive portions which may be of doubtful soundness, should be abandoned. Only by deliberately reflecting the flaps from the whole mamma, and detaching it first at its edge, can the various undetected prolongations of the tumour and outlying nodules be included in the operation.”

Here is the germ of all the modern surgery in connection with cancer of the breast and it is noteworthy that amongst the cases cited in support of his thesis Moore describes the putting of a drainage tube through the back of the armpit, and this was in the year 1858 (Case 10, page 266).

No report of the paper appeared in *The Lancet* or the *British Medical Journal*, but the *Medical Times and Gazette* gave a short summary of the subsequent discussion. Mr. Birkett, Mr. Hulke, Mr. Henry Lee and Mr. Wynn Williams were against it; Mr. Savory was doubtful; Mr. Jonathan Hutchinson spoke in favour of early removal of mammary cancer: but it was clear that none of the speakers realised the epoch-making character of the paper or appreciated the vista it opened up for future work.

It did not however fall entirely on stony ground. Joseph Lister [1827-1912] said three years afterwards:—"I have at present a patient about to leave the Infirmary three weeks after the removal of the entire mamma for scirrhus, all the axillary glands having been at the same time cleared out after division of both the pectoral muscles so as to permit the shoulder to be thrown back and the axilla freely exposed as is done in the dissecting room—a practice which I have for some years adopted where the lymphatic glands are affected in the disease."

These earlier cases were treated at the Glasgow Infirmary, for Lister did not return to Edinburgh until 1869. They show the adaptability of Lister's mind as a surgeon and must have seemed strange and almost unbelievable to those who had watched the work of his father-in-law, James Syme, whose incomplete operations—like that on Alie (about which you have already heard) were only too often followed by death from sepsis or early recurrence.

Mitchell Banks read a paper in 1877 before the Lancashire and Cheshire Branch of the British Medical Association, which he called "A Plea for the more free removal of Cancerous Growths." The substance of the paper was published afterwards in the *Liverpool and Manchester Surgical Reports* for 1878 (pp. 192-206). The *Journal* at that time had 478 subscribers and circulated locally. A few reprints were issued by Jane & E. Jones, Booksellers and Stationers, Market Square, Llanerchymedd, probably in the same year (1877); but no notice of it—even in abstract—appeared in the *British Medical Journal*, *The Lancet*, or the *Medical Times and Gazette*. It attracted

therefore very little attention, and the reprints were so few that I have had considerable difficulty in finding a copy.

Mitchell Banks was 35 years of age in 1877. He came to Liverpool in 1868 as assistant to E. R. Bickersteth, and had recently been appointed full surgeon to the Liverpool Royal Infirmary where he had been assistant surgeon since 1875. He was also Lecturer on Anatomy in the school of medicine. He received his early education at the Edinburgh Academy and had graduated M.D. with honours at the University of Edinburgh in 1864, serving as dresser and house surgeon to James Syme, at whose house he must have met Joseph Lister.

In this first paper Mitchell Banks acknowledges his indebtedness to C. H. Moore, and it is evident that he knew of the work Lister was doing to reduce sepsis. He deals more especially with recurrence as it occurs in the axillary glands, and says :—
 “ Unless there be some serious adhesion their removal is by no means so difficult or dangerous a process as it used to be considered. If the breast is being removed at the same time, a good plan is to leave its upper angle still attached and carry it and the glands all away in one piece. Having fairly made out the axillary vein all further work must be done with the handle of the knife and the finger. With the knife you define the vein and loosen the glands. Not a vestige of the glands must be left, even if you go as high as the clavicle in search of them. He then proceeds :—“ To make the clearing out of the axilla a necessary part of amputation of the breast would certainly make the latter operation a much more fatal one than it is at present. Indeed, in the way in which it is generally done now, it is an operation which is very rarely fatal, and then only from accidents such as pyæmia to which the smallest surgical procedures are liable. But, after all, I suspect that most men who, having witnessed lingering death from cancer, would, if the case affected themselves, prefer to die rather from the effects of an operation than from the effects of the disease, unless there were some imperative necessity why life in agony should be prolonged.

“ In conclusion, Gentlemen, if you ask why I have taken up your time by expressing opinions which are well-known and

thoroughly recognised, I can only reply by saying that while all men profess the doctrine of extensive and sweeping removal, my experience forces me to believe that comparatively few carry it into actual practice. My object is not to propound any new thing but to encourage you to persevere in a good work, although frequently cast down by disappointing failure. True removal rightly so-called will in many instances be found a radical cure but it *must* be *true* removal."

It will thus be seen that the operation advocated at this time by Mitchell Banks was based entirely upon clinical experience. He was not concerned with the scientific aspect of the way in which cancer had spread any more than Joseph Pancoast had been at Philadelphia in 1844. He was merely trying to prevent recurrence and so, as he hoped, to cure his patient or at any rate to give her a longer span of life in comparative comfort.

Mitchell Banks continued the attack on cancer and in November 1882 he gave an address at the Liverpool Medical Institution, which was published in the Liverpool Medico-Chirurgical Journal in the following year and afterwards in the form of a pamphlet, printed at Edinburgh by Neill and Co. He again emphasised the importance of removing the axillary glands when operating upon patients with cancer of the breast, saying :—"I need hardly descant upon the remarkable revolution which has taken place during the last fifteen years in our views as to the removal of infected glands. When I was a student a proposition to clear out the axilla would have been considered madness. In the present paper a principal object is to advocate the removal of the axillary glands as well as the breast in *all* cases, whether we can feel them enlarged or not—in fact, to make a clearing out of the axilla a necessary part of the operation for removal of the breast. I have been quietly practising this for three or four years, having been driven to the conclusion that it was the right thing to do by discovering that even in those cases where certain glands could distinctly be felt enlarged when the axilla was opened small ones were discovered which, although most palpably affected, were quite incapable of being felt from the outside.

I wish, therefore, with all earnestness to insist upon it that there is a stage—the earliest stage—when they are certainly infected, although to the touch through layers of fat and skin nothing amiss can be felt. The remarkable thing is that it has not been practically acted upon and this proceeding is by the great majority of surgeons reserved for those cases where the glands are as big as walnuts. When they cannot be plainly felt the axilla is left untouched, with the result that the patient goes away and in a few months comes back with the breast cicatrix quite sound but the armpit filled with a mass of cancer which has got such a hold of the vessels and nerves as to render the removal impossible..

“Now at the time of the breast removal fifteen minutes’ more work would very likely have sufficed to prevent this. While the glands are yet small they and the whole fat and cellular tissue of the axilla can be pulled out by the fingers with the greatest ease and, while I am willing to admit that the opening of the cavity adds not a little to the danger of the original operation I argue that the increased immediate risk is far more than counterbalanced by the increased protection against return of the disease. I beg leave, therefore, most strongly to urge the invariable clearing out of the axillary glands along with the removal of the breast, the one operation being useless without the other. As you cannot tell whether the glands are affected or not till you have them in your hand, let them be *always* removed and so increase the patient’s chances of future immunity.”

Twelve years previously, as I have shown, C. H. Moore had expressed similar opinions about the axillary glands. When Moore found that his previous paper had been ignored by the surgeons who were his contemporaries, he wrote:—“The period at which cancer is first formed in the glands is uncertain, but I am led to think it is very early indeed. I have observed them to be decidedly tender before they were in any degree enlarged or indurated. I have met with very few instances in which the glands were not already affected however recent the primary disease. So early do they become infected that they can never be assumed to be healthy.”

Butlin, in the third edition of Holmes’ System, published

twelve years later, modifies this clear statement made by Moore, ignores the work of Mitchell Banks, and says, "the glands may be removed even if many of them be enlarged," teaching which was, again, as definitely retrograde as Gross' had been in relation to Pancoast. Mitchell Banks was more than justified therefore in pointing out the necessity of complete extirpation.

Mitchell Banks in a second paper gives a remarkable instance of his sound common sense and clinical acumen. He says, pointing out the dangers of the use of the spray in Listerian operations:—"As a rule I employ Listerian methods and in hospital always. But in operation they have this great disadvantage, that the spray seriously cools down the patient and this lowers her vitality. If the operation is performed in the old-fashioned and useless way there is very little shock. If performed in the thorough and sweeping way I am now advocating there is a serious shock, seeing that from thirty to forty minutes is the very shortest time in which it can be satisfactorily done. Now, let any healthy woman get out of a warm bed, strip herself naked to the waist and then go and lie down on the kitchen table for forty minutes, and I shall be very much surprised if she has not a cold next day. But in addition to this let a cold spray play upon her and, furthermore, let a great mass of heat-conserving skin and fat be carried away from the chest, so that nothing but ribs and muscles intervene between the lung and the air and still let the cold spray play upon her. Is not this likely to be very depressing? I am convinced that it is so; and if the operator, in place of doing his work rapidly, niggles and fiddles about it so that the patient is kept for a long time under the combined influence of the cold spray, anæsthetic and loss of blood, then the result is that a distinct catarrhal pneumonia very speedily appears and this I have seen put the patient's life in imminent jeopardy on several occasions. For this reason, in private, when there is but little fear of septic influence, if the patient is weakly, I content myself with simply washing out the wound with carbolic solution and maintaining a modified antiseptic dressing. In hospital I do not use the spray till the operation is pretty well completed when I turn it on for a minute or so and drench all the parts well before the final stitching up

is done. Another point is, that having detached the breast I leave it hanging by the axillary end; and then, before attacking the armpit, I draw together as much of the wound as will possibly come and cover up the remainder with sponge and gauze. This has two advantages: it keeps the cold from the chest, and it enables the operator (if he finds that he cannot thoroughly remove the glands, or sees the patient becoming collapsed) to terminate the operation at once. If the cancerous lump is deep in the breast and the skin over it is quite moveable then some of the latter at the margin of the gland may be kept to cover the wound. But if any part of it is involved then a circle should be drawn round the breast and it should be cut clean off without the remotest regard to flaps or coverings of any kind.

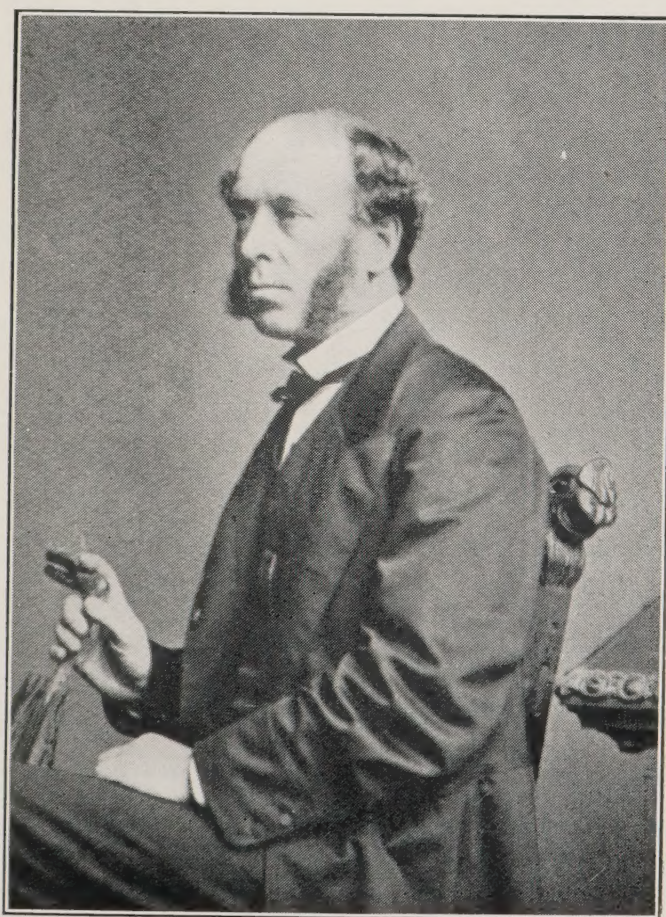
The breast being finished with, the incision should be carried up into the axilla about an inch below the margin of the great pectoral muscle. With regard to the lower axillary glands they are capable of easy removal and, even the highest ones can, as a rule, be readily brought down from the very top of the cavity and pinched off between the nails of the finger and thumb. I have never yet found occasion to divide the pectoral muscles."

Banks made his views known to London surgeons in 1887 by reading a paper at the Harveian Society, "On Extirpation of the Axillary Glands, a necessary accompaniment of removal of the Breast for Cancer." He said in the course of his remarks:—"Having cleared out the breast I do not cut it adrift but leave it suspended by its upper and outer end. I next open the axilla and in so doing carry away a continuous mass of tissue from the mamma with the object of including in it all the lymphatic vessels going from the breast to the glands. This is an important step and should never be neglected. Is it necessary to divide the pectoralis major? Very seldom, I think. If the floor of the axilla has been widely opened and if the area is properly drawn up, you can feel with your finger quite well up to the clavicle and pinch or pull down glands from the very top of the cavity. Dividing the pectoral muscle adds somewhat to the tediousness of the operation, but that is all."

Much had taken place in regard to mammary cancer between



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CHARLES HEWITT MOORE [1821—1870].
SURGEON TO THE MIDDLESEX HOSPITAL.

1887 and 1900 when Banks was invited to deliver the Lettsomian Lectures at the Medical Society of London. A fierce battle had been fought and Banks had substantiated his plea for a wider operation to cure and not merely to prevent recurrence of mammary cancer.

Trother Heidenhain, of Berlin, had in 1889 made sections of the under-surface of breasts removed for cancer, and had shown that many bore evidence of incomplete removal. He advised, therefore, that a layer of the pectoralis major muscle should be taken away as well as the fascia covering it. He also drew attention to the spread of cancer by the lymphatics as apart from the lymphatic glands. His work was amplified by Prof. Harold Stiles in Edinburgh and by Mr. Sampson Handley in London.

Banks points out in his Lettsomian lectures the value of drainage through an incision made over the latissimus dorsi, though this had already been done by C. H. Moore in 1859. He states too that he recognised the value of Thiersch's method of skin-grafting which was introduced in 1886.

In the meantime advances had been made in the United States. Samuel W. Gross (1837-89), surgeon to the Jeafferson Medical College and to the Philadelphia Hospital, changed the retrograde teaching of his father, who had held the same positions, when he wrote in 1880 of cases of cancer of the breast "the proper procedure is to remove the entire breast and its coverings by a circular incision, search for any out-lying lobules that may be disseminated through the mammary region, dissect off the fascia of the pectoral muscle and prolong the outer portion of the incision into the axilla with a view to its thorough exploration. Although the glands may have eluded detection previous to surgical interference careful examination will usually disclose that several are already converted into secondary tumours, and in this event the axillary space must be thoroughly cleaned out with the object of getting rid of so many independent sources of infection of the adjacent tissues and the associated glands.

Ample experience shows, first, that the seats of recurrence, or rather of further spread of the disease after operation, are the skin, the pre-mammary fat, remains of the mamma and glands of the axilla, and, secondly, that recurrence in the axilla

is far more frequent after removal of the breast alone than when the cavity was freed of its contents simultaneously with the extirpation of the breast. Even if I should be deemed too bold to recommend that the axilla be attacked when it is apparently free from disease, surgeons of extended experience will certainly agree with me in regarding the adipose tissue as being largely infiltrated by young cells, for it is just precisely in corpulent subjects that local reproduction is most marked along the line of the cicatrix of partial operations, or, in other words, in the fat which they have been too anxious to save in order that they might secure thick and seemly flaps."

The next great advance was made by William Stewart Halsted, surgeon to the Johns Hopkins Hospital at Baltimore. Halsted was born on September 23rd, 1852, and was therefore 25 years old and an interne at the Belle Vue Hospital, New York, when Banks was doing his excellent work at Liverpool in 1877. Halsted had already made his name as a pioneer of antiseptic surgery in New York when he was appointed in October 1889 the first Associate Professor of Surgery in the newly-opened Johns Hopkins Hospital, where he was head of the Laboratory of Experimental Surgery as well as Surgeon in charge of wards. He was thus able to cultivate both the science and the art of surgery. He was endowed with a scientific mind, combined with a plodding industry. He was a slow but very careful operator, and such an excellent judge of character that he selected a most competent band of assistants and was thus the founder of a school of scientific surgeons. His work was original in the most strict sense. He visited Europe frequently, knew what was being done there and was influenced to some extent by the German school of thought, although there is no evidence to show that the methods he practised were not wholly original.

The work done in Germany between 1877 and 1889 in connection with cancer of the breast was important both on the scientific and on the clinical side. Volkmann had said in his *Beiträge zur Chirurgie*:—"I make it a rule never to do a partial amputation for cancer of the breast but remove the entire organ even for the smallest tumour and at the same time I take away a liberal piece of the skin. The skin defect is,

of course, very great when such an operation is done and the wound consequently is a long time in healing. I cut right down to the pectoralis muscle when I make the lower incision and clean its fibres just as I would in making a class-room dissection, carrying the knife parallel with the fibres of the muscle and penetrating into their interstices. The pectoralis fascia is thus removed entirely. I was led to adopt this method because microscopical examination showed repeatedly what I had not expected, that the fascia was already carcinomatous whilst the muscle was certainly not involved. In such cases a thick layer of fat, which was apparently healthy, separated the carcinoma from the pectoral muscles and yet the cancerous growth, in places only demonstrable by the microscope, had shot its roots along the fibrous septa and so, extending downwards between the lobules of the fat, had reached and spread itself out in flat islands in the fascia. It seems to me therefore that the fascia serves for a time as a barrier and is able to arrest the spread of the growth."

Heidenhain in like manner said:—"I am firmly convinced from what I have seen that carcinomata when they have actually made their way into the lymphatic channels, which is usually the case, have always sent their advance guards to the surface of the muscle, no matter what thickness of fat lies between the breast and the muscle; in other words that however freely the breast moves on the underlying parts the disease has almost certainly advanced as far as the surface of the muscle."

Halsted's spiritual home was in Germany. He quotes Bergmann, Billroth, Czerny, Fischer, Güssenbauer, König, Küster, Lücke and Volkmann, but makes no mention of C. H. Moore or Mitchell Banks, of whose work at any rate when he was writing in 1889 he seems to have been entirely ignorant. In 1888 he devised an operation to prevent metastases as well as recurrence in cancer of the breast; in other words to cure rather than to relieve cancer. The essential feature of the operation lay in the removal of the whole area that might be involved in a single piece without allowing the incision to approach the actual tumour. An attempt was made to go so far wide of the new growth that no tissue should be divided which was already affected even in its most remote prolongations. As

early as 1889 he was teaching that "The pectoralis major muscle entire or all except its clavicular portion should be excised in every case of cancer of the breast because the operator is enabled thereby to remove in one piece the whole of the suspected tissue.

The suspected tissue should be removed in one piece (i) lest the wound become infected by the division of tissues invaded by the disease or by lymphatic vessels containing cancer cells, and (ii) because shreds or pieces of cancerous tissue might readily be overlooked in a piecemeal extirpation."

Halsted modified his operation from time to time in the light of further experience until he removed both pectoral muscles with all the lymphatic glands and adjacent connective tissue not only in the axilla but along the side of the neck with subsequent skin grafting of the wound. He paid extreme attention to hæmostasis and cleanliness and was insistent that the tissues should be handled with the greatest gentleness. He published two important papers. The first gave the results of his operations from 1889-94. It appeared in the Johns Hopkins Hospital Reports for 1895 and, in identical words, in the Transactions of the American Surgical Association. The second paper was read at a meeting of the American Surgical Association held at New Orleans in 1898, with the title 'A clinical and histological study of certain adenocarcinomata of the Breast and a brief consideration of the supraclavicular operation and of the results of operations for Cancer of the Breast from 1889-1898 at the Johns Hopkins Hospital.' The paper begins with a description of the method by which the tissues are examined:— "In breast cases the entire mass—muscle and all—is saved (for subsequent examination). Before it is severed from the body in the course of the dissection, ligatures, black and white, are placed in it here and there as landmarks. When a flap of skin is to be dissected back its tip is left *in situ* as a bearing point on the tissues to be removed. If by accident or design a scrap of tissue is dissected off during the operation from the tumour mass it is at once labelled. When we are in doubt as to the cancerous involvement of the minute gland at the highest reachable point below the clavicle, it is sometimes disassociated by a special ligature. We are, if possible, more fully convinced

than ever of the value of painstaking scrutiny of the naked eye appearances and of detailed descriptions of all that can be seen on the freshly-cut surfaces of the tumour and of the appearance and relation of the outlying parts. We have had occasion to regret the fact that the macroscopic findings have been insufficiently portrayed in some few of our earlier cases. One person should be responsible for the preservation of the breast material from first to last and the operator himself should study the material in the operating room immediately after the operation and in the laboratory. There is a gap between the surgeon and the pathologist which can be filled only by the surgeon. The pathologist seldom has the opportunity to see the diseased conditions as the surgeon sees them. A tumour on a plate and a tumour in the breast of a patient, how different! Its blood, its colour, its form, its freshness, its consistency are more or less lost when the tumour has been removed. The translucent zone of certain rapidly growing cancers soon becomes opaque."

This survey of operations upon the breast for the relief of cancer shows, I think, that the progress towards surgical cure has been in a straight line, and that surgeons of many nations have taken part in it. J. L. Petit, in Paris, with his logical French mind, was amongst the first to recognise that the tumour in the breast was connected directly with the enlargement of the glands in the axilla, and taught that both breast and glands should be removed if the best results were to be attained. C. H. Moore in London, and Prof. Pancoast in Philadelphia, advocated removal of the whole breast instead of the partial operations undertaken by their contemporaries, and they, too, recommended that the axillary glands should be extirpated. Lister followed their example, and went even further, for he divided the pectoral muscle the more freely to gain access to the axillary glands. Mitchell Banks, when he was house surgeon to James Syme at Edinburgh, had seen the unsatisfactory results following an incomplete operation. He must have noticed the improved operative measures adopted by Lister. Banks practised the modern operation for cancer of the breast by removing the whole organ, and with it the enlarged lymphatic glands. Like an Englishman, he was essentially practical, looking, in his

earlier operations, more to the prolongation of life than to the why or wherefore of the means he adopted for its accomplishment.

The line of progress then passed to Germany, where the surgeons enlisted the services of pathologists skilled in the use of the microscope and of the then newly-invented tissue stains. They examined the breast and surrounding tissues to find out why cancer recurred locally.

Their conclusions attracted the notice of W. S. Halsted at Baltimore, who made full use of them, working in his theatre and laboratory under the most favourable conditions. His operations were carried out on thoroughly scientific lines and his results, both as regards the immediate mortality and subsequent non-recurrence, were excellent. He went perhaps a little too far, and the pendulum is swinging back to less extensive operations than he carried out. The reaction is due in part to the fact that women are becoming educated to the knowledge that their best chance of cure lies in early recognition of the disease, in part perhaps to the discovery of the x-ray by Röntgen and to the use of radium.

It is interesting to ascertain why the work of Halsted received world-wide recognition whilst the equally good work of Mitchell Banks was less well known. The answer is two-fold. Mitchell Banks operating in a small school took but little trouble to make his results known *urbi et orbi*. He published his early and really startling results in the Liverpool and Manchester Reports which probably had a circulation of less than 500 copies. A few reprints of his paper were struck off. They were printed in a Welsh village by a local printer, and their very scarcity shows how few they were. Secondly, he failed to overcome the inertia which was characteristic of the British surgeons of his generation. These surgeons took it for granted that recurrence was the natural sequence of an operation for cancer of the breast. They had not accepted the teaching of Lister and they knew that a more extensive operation meant an increased mortality. They were content, therefore, to go on in the old way. Mitchell Banks with a more open mind shared the fate of Harvey in relation to the circulation of the blood; of Simpson with anæsthesia, and of Pasteur and Lister in connection with micro-

organisms. Each had to wait for a younger generation, and I think that the value of the work done by Mitchell Banks is only now becoming suitably recognised.

It was far otherwise in the United States. There the mind of the surgeon was more receptive. He was used to relying upon himself and was eager to try new methods. He was accustomed to travel abroad and to criticise what was being done in different countries, whilst the British surgeon rarely left his native shore. The American surgeon wrote and spoke fluently ; a well-organised medical press was at his service, and there was a large reading public. Halsted was peculiarly well placed for disseminating a knowledge of his work. The Johns Hopkins Hospital at Baltimore had just been opened and had attracted the best surgical talent amongst the vast population of the United States. Halsted had, too, a talent for selecting young men who justified his choice by their subsequent careers, and thus became the founder of a school of experimental surgery which had no counterpart in the British Isles. He selected as his assistants Bloodgood, Cushing, Finney and Young, with whose help his technique was above reproach. He had too, at his disposal the services of trained pathologists and clerks on a system which was wholly unknown in this country. Halsted thus became known to thousands of medical men, whilst Mitchell Banks only came under the notice of hundreds. Halsted's work became widely recognised ; that of Mitchell Banks remained in comparative obscurity, so obscure in fact that Halsted, who was quite fair-minded, remained in ignorance of it. The work of these two pioneer surgeons was therefore carried out independently, and neither was indebted to the other. Both tilled the same field and both reaped a harvest ; but Halsted overshadowed Mitchell Banks, rather by force of circumstances and his surroundings than by reason of greater merit and originality. Mitchell Banks is now filling the place to which he is entitled, for Mr. Sampson Handley says in the edition of Choyce's *System of Surgery*, published in 1932 :—" The principle is not merely to amputate the breast but to remove intact the permeated area of the lymph vascular system which surrounds the primary growth in one piece with the lymphatic glands

which may have been embolically invaded along the trunk lymphatics of the permeated area. The incision should be circular and concentric." Here is the essence of the teaching of Mitchell Banks amplified by further knowledge of the lymphatic system.

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